2. On the Occurrence of a new Species of *Euphysetes* (*Euphysetes pottsii*), a remarkably small Catodont Whale, on the Coast of New Zealand. By Julius Haast, Ph.D., F.R.S., Director of the Canterbury Museum.

[Received March 26, 1874.]

Amongst the specimens lately added to the collections in the Canterbury Museum, either new to science or at least to New Zealand, none is more interesting than that of a remarkably small Catodont Whale, allied to *Euphysetes grayii*, which was stranded amongst the rocks in Governor's Bay near Ohinitaki, the residence of T. H. Potts, Esq., F.L.S., by whom it was secured and presented to the Canterbury Museum.

As far as I am aware, only another species of the genus *Euphysetes* exists in the Australian Museum, obtained in 1851 in Port Jackson, of which a description was given in Wall's 'History of a New Sperm Whale,' 1851, 8vo, p. 37, t. 2 (skeleton), but which, according to Krefft, was entirely written by the eminent zoologist W. Sharpe MacLeay (see British-Museum 'Catalogue of Seals and Whales,' p. 218 *et seq.*).

The specimen under review was found by some fishermen amongst the rocks on the 17th of August of this year, when it tried in vain to regain the sea, but was easily secured.

As Mr. Potts was kind enough to send immediately a telegram from Lyttleton, the taxidermist of the Museum, Mr. F. R. Fuller, was enabled to proceed at once to the spot, by which not only all necessary measurements were secured before the animal was cut into for procuring the oil, but also both skin and skeleton were obtained in perfect order.

The animal on examination proved to be a female, apparently full-grown, and had the following dimensions:—

	ft.	in.
Total length	7	2
Breadth of tail	1	$4\frac{1}{2}$
Around body behind pectoral fins	4	$2\frac{1}{2}$
„ „ behind eye	3	3
„ „ before dorsal fin	3	10
Pectoral fin, length	0	9
„ breadth	0	$3\frac{3}{4}$

Colour black, belly greyish white.

There is only one single valve covering the blow-holes, the slit being 2 inches long, of which $1\frac{1}{2}$ inch lies on the left and $\frac{1}{2}$ an inch on the right side of the top of the head. The skin surrounding the valve is raised in a lunate form rather conspicuously on the left side, open posteriorly; the left side of the valve is far more developed and stronger than the right one. The animal, however, was unfortunately too much disfigured on the top of the head by blows or other causes, so that it was impossible to ascertain whether the small

channel of the right blow-hole had an opening of its own so that it could throw out a separate jet of water, or, what is more likely, could only add a minute quantity to the main jet thrown out by the left blow-hole, of which more anon.

The form of the dorsal fin, also, could not be well ascertained, as the hind edge, which is described by MacLeay as nearly perpendicular and concave, had in our specimen been torn away previously, the wound being well scarred.

The small eyes situated so low down the broad head, the pectoral fins of such inconsiderable size, the small mouth being placed, like that of a shark, well back, give to this animal a strange appearance.

When first examining the anatomical characters of the skull, it at once became evident that, if not identical with *Euphysetes grayii*, it would be closely allied to it.

	ft.	in.
Entire length of cranium	1	1·5
Greatest breadth of cranium (at parietal region)		11·2
Beak from notch, length		5·2
Beak, breadth at notch		6·1
Length of beak at occipital bone		5·5
Breadth of beak at occipital bone		6·8

From these measurements it will be seen that the beak is shorter than broad, but not quite so much truncated and blunt as in Gray's whale.

However, the most characteristic feature in the skull is the asymmetry of the bones, which makes it appear at first sight that we have a remarkable case of deformity before us.

MacLeay has given a masterly description of those anomalies, and has shown how, by the great development of some bones, such as the right intermaxillary, and by the stunted form of others, these striking contortions are brought about, by which that remarkable asymmetry is caused—to which I can add nothing, as his description agrees entirely with our New-Zealand skull.

The blow-holes are exceedingly disproportionate in size, the right one being scarcely the tenth of an inch in diameter, whilst the left is nearly fifteen times as large, of an oblong form, being $1\frac{1}{2}$ inch long and $1\frac{1}{8}$ inch broad. The rami of the lower jaw are very thin and fragile, and have, like Gray's whale, scarcely any condyles. It agrees also with the latter, except in the position of the teeth, having 13 on each side, which are described by MacLeay as projecting horizontally and being curved upwards. In the New-Zealand species they have the same slender conical form, but stand out sideways with their points curved inwards, the last tooth on each side, however, being curved forward, its hook nearly touching the preceding one ; the first two teeth on each side stand nearly perpendicular to the jaw, whilst the rest incline slightly backward, with the exception of the last tooth, which has again a perpendicular position. All these teeth fit into sockets on both

sides of the roof of the mouth, provided for their reception in the gums.

However these minor deviations would not constitute such a specific difference as to separate it from the Australian species did not the rest of the skeleton present such marked differences.

MacLeay states that Gray's *Euphysetes* has 52 vertebræ; but I find that there must be some mistake in the enumeration of the different forms of vertebræ, because when added they only amount to 51, viz.:—7 cervical, 14 dorsal, 9 lumbar, 21 caudal (of which 13 have chevron bones attached together); total 51.

The number of the vertebræ of the New-Zealand *Euphysetes* is one less, namely 50; moreover they are differently arranged. Its seven cervical vertebræ are soldered together and have all the peculiar characteristics of the Australian species, whilst it has only 12 dorsal (instead of 14), 11 lumbar (instead of 9), and 20 caudals with 8 chevron bones attached (instead of 21).

The Australian species has 14 ribs, whilst the New-Zealand species has only 12, of which the first one is broad and flat and has, like the second, third, fourth, fifth, and sixth, two articulating surfaces, whilst, according to MacLeay, the Australian species has only one articulating surface on the first rib; the second rib still exhibits a considerable breadth, whilst the succeeding ones become gradually narrower; the last six ribs, which assume a rounded shape, possess only one articulating surface.

Thus, even supposing that the minor differences in the form of the skull might possibly be due to sex, the number, arrangement, and form of the vertebræ and ribs alone would prove the distinct specific character of the New-Zealand specimen, for which, therefore, I wish to propose the specific name of *Euphysetes pottsii*, in honour of T. H. Potts, Esq., F.L.S., by whom the specimen was secured to science.

The contents of the stomach consisted of a dark slimy matter from which no clue could be obtained as to the usual food of the species under review; but we may conclude, from the absence of the horny beaks of Cephalopods, of which some years ago we obtained nearly half a bushel in the stomach of *Berardius arnouxii*, that this species does not feed on them; moreover the position and smallness of the mouth shows that this animal is probably a ground-feeder, existing perhaps on the smaller Hydroid Zoophytes.

Before concluding I wish to draw attention once more to the remarkable asymmetry of the cranium of this new whale, which, probably more than any other known catodont cetacean, shows this so conspicuously. We are so accustomed to observe almost invariably in the skeletons of the vertebrates a perfect bilateral symmetry, that any deviation from this rule is generally regarded, if not as a monstrosity, at least as a deformity. It is therefore very striking to find, in a whole and important cetacean section, the Denticete, the upper surface of the skull, with very few exceptions, unsymmetrical, amongst which the family of the Catodontidæ is the most conspicuous. This family, amongst other characteristics, is distin-

guished by the nostrils being enormously disproportionate in size, the left one being the largest; at the same time the nasal bones, as those of the face, are generally unsymmetrical and distorted.

Of them, the genus *Euphysetes* may be said to possess this unsymmetrical distortion of the skull and the difference in the size of the nostrils in the highest degree.

Systematic zoologists have generally hitherto had little time to do more than to fix the so-called generic and specific characters, without being able to examine into the causes why certain animals exhibit such peculiar forms and colours and why their skeletons have assumed the distinct morphological characteristics by which they are distinguished from all others.

We can understand that the use or disuse of certain limbs of an organism may develop them to a more or less degree, or stunt their growth, by which other portions of the skeleton will in their turn become differentiated.

Thus, to give only one instance, the disuse of the wings of the Kakapo (*Strigops habroptilus*) has also altered the form of the sternum (which has such a very prominent keel in the whole Parrot tribe) to such an extent that it is only feebly marked; but in this case, as in most others, the symmetry of the skeleton is not interfered with.

In some other cases (as, for instance, in the Pleuronectidæ or flatfishes) we can easily trace the asymmetry of their skeleton to adaptation, viz. to their mode of obtaining food and at the same time preserving themselves from their enemies. If in the struggle for existence they had not in the course of ages assumed their present form, they would doubtless have long become extinct. Moreover we know that the flatfishes are symmetrical in the young state, and as they grow older the skull not only becomes distorted but one eye actually crosses gradually from one side to the other to take its place close to the other eye.

However in the instance of the Toothed Whales, at least at first sight, such vital considerations do not appear to exist; the blow-holes or naso-palatine breathing-passages, situated on the very top of the head, by which the cetaceans have to expose only a very small portion of their body when they rise to the surface for expelling the pulmonary discharge of used-up air, by which the spout is generally formed, and for oxygenizing again the blood by inhaling a great quantity of atmospheric air, do not receive more protection by being so remarkably unequal in size. Moreover it appears to me that an animal would breathe as freely and effectually if the blow-holes were of equal size, of course always provided that the quantity of air to be inhaled and of the pulmonary vapour to be expelled found the same amount of room for passing to and fro. Thus in the skull of the *Epiodon chathamiensis* described by Hector, and of which we possess a fine skeleton in the museum, the blow-holes, although twisted considerably to the left, are of the same size; but the asymmetry of the upper portion of the skull is produced by the right intermaxillary bone being far more developed than the left one, and, moreover, rising as a broad ridge to the very summit of

the skull, and forming there a crest of considerable size on the right side only.

Unfortunately I have not access to all the necessary works of reference to inquire if this question, as to the causes, growth, and uses of asymmetry in the Toothed Whales, has already been treated by naturalists in the northern hemisphere; but it is evident, from an examination of the drawings representing the three views of the fœtal Cachalot (*Catodon*) in the Museum of the Royal College of Surgeons, that the remarkable asymmetry exists already in that early stage of existence.

On the other hand I may ask, why should the *Balænidæ* have a symmetrical skull, breathing, as they do, exactly in the same manner as the Toothed Whales? Eschricht, who has described the important changes which the skulls of the *Balænidæ* undergo, has shown that they are in the fœtal state quite symmetrical, although later on slight inequalities in the maxillæ are sometimes discernible.

As far as I am aware, no cognizable reason can be given to account for this asymmetry in the skull of the Toothed Whales, and we are therefore almost led to assume that some of their remote ancestors were deformed by some accident and that thus this asymmetry of the skull was inherited by their progeny to a more or less extent, because it is difficult to believe that in the struggle for existence, in the adaptation to altered circumstances and a different mode of life, this strange asymmetry could be of any vital importance.

The study of the ontogeny of this species and of the phylogeny of the family to which it belongs, and of its extinct ancestors is therefore of the highest importance in considering the question of the origin of species, because every step in that direction is a clear gain to science.

It may be possible that this point has already been treated at length by some naturalists; but I am not aware that this is the case; and my wish to draw the attention of my brother naturalists in New Zealand, and other countries where an opportunity is offered by acquiring specimens of Toothed Whales in all stages of growth to study this striking fact in osteology, has been my only motive for alluding here more fully to it than I should otherwise have done.

3. List of Diurnal Lepidoptera collected in Cashmere Territory by Capt. R. B. Reed, 12th Regt., with Descriptions of new Species. By Frederic Moore, India Museum, London.

[Received March 27, 1874.]

(Plate XLIII.)

The only notices hitherto published of the species of Lepidoptera known to inhabit Cashmere are those by Kollar in Hügel's 'Kashmir,' and recently by Capt. Lang of a small collection made at Goolmurg by the late Dr. Jerdon.